



Power Systems Design: Empowering Global Innovation

On showers and vampire energy

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“Vampire energy” is power used by appliances when they are “off.” Unplugging your cell phone charger saves about 500 watt-hours per year. Multiplied by millions of wall-warts, that is significant. On the other hand, we give far too little attention to the energy that we flush down the drain. Newer shower heads use 2.5 gallons per minute, and a 20 minute shower uses about 7,500 watt-hours of energy. That is 2,700,000 watt-hours per year per clean person, or 5,000 times the vampire cell phone charger. That energy usage is expensive and wasteful, and many places suffer severe water shortage. Both would be helped by reducing that waste.

Searching “recirculating shower” finds showers that filter and recirculate water so only a small amount needs to be heated initially, and the make-up energy as you shower is small. A very long shower uses little more energy than a short one. Some plumbing changes and a smart controller may allow guilt-free showers of any duration. We could use heat from an air conditioner condenser. In winter, if the heat were recovered to offset energy for domestic heating, the net energy for the shower would be “free.”

Wastewater can be cleaned to drinking water standards, but there are psychological barriers to drinking recycled sewage, the “yuck” factor. However, we use relatively little water for drinking and cooking. Probably most people would accept recycling water from the washing machine, dishwasher and the shower for reuse for the same purpose.

Equipment to treat and recycle water for domestic use would be very expensive, but so is the cost of a conventional water supply and sewage disposal. A drilled well and pump can cost \$10,000, and a mound septic system can run \$30,000. That could buy a lot of equipment. Millions of dollars that were not spent on a sewer plant expansion could fund the equipment for thousands of homes or apartments, saving a lot of energy and reduce water usage enormously.

Another large waste of energy is air dumped by exhaust fans in restaurants. Cleaning and recirculating air could save a lot of energy, and would need smaller (less expensive) air conditioners and heaters.

Alas, efforts at implementing any of this very likely would run afoul of local building standards. In most places, it is impossible to get a building permit without a conventional water source and sewer or septic system. Restaurants have mandates for air circulation, not air quality.

It is great that Energy Star encourages more efficient appliances. However, it is time to pick some higher hanging fruit. Recycling of water and air should be encouraged, and any local regulations that impede it should be made illegal.

Adoption might be slow, first where water is scarce or on-site sewage disposal is impossible. Air might first be recycled where the outside smog is bad enough to be unhealthy. In time, the equipment would get better and less expensive. The prospect of much lower energy and water bills will encourage more and more adoption. Eventually, it should be mandatory.

The opinions of the writer are not necessarily that of the PSMA